

WHAT IS CLAIMED IS:

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1. An image pickup apparatus comprising:
a plurality of pixels; and
a color filter array of four colors disposed on
said plurality of pixels,
wherein said color filter array has a periodicity
of two rows × two columns, and colors of four color
filters in a periodical unit of two rows × two columns
are all different from each other.
- 10 2. An image pickup apparatus according to claim
1, wherein the four color filters include a filter of
transmitting only green light in a visible light range,
a filter of intercepting only blue color in the visible
light range, a filter of intercepting only green light
in the visible light range, and a filter of
intercepting only red light in the visible light range.
- 15 3. An image pickup apparatus according to claim
1, further comprising means for performing an operation
of $A + B - C - D$, where A, B, C, and D represent
signals picked up from an area of two rows × two
columns.
- 20 4. An image pickup apparatus according to claim
3, wherein the signals A and B are disposed on a same
line or on a same column, and the signals C and D are

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disposed on a same line or on a same column.

5. An image pickup apparatus according to claim
3, further comprising means for performing an operation
5 of $A + C - B - D$.

6. An image pickup apparatus according to claim
5, wherein the signals A and B are disposed on a same
line or on a same column, and the signals C and D are
10 disposed on a same line or on a same column.

7. An image pickup apparatus according to claim
1, further comprising means for reading a difference
between an addition signal of a first row, first column
15 signal and a first row, second column signal and an
addition signal of a second row, first column signal
and a second row, second column signal, respectively in
an area of two rows \times two columns column, and means for
reading a difference between an addition signal of a
20 first row, first column signal and a second row, first
column signal and an addition signal of a first row,
second column signal and a second row, second column
signal, respectively in the area of two rows \times two
columns column.

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8. An image pickup apparatus according to claim
7, wherein the areas of two rows \times two columns are

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disposed without any space therebetween.

9. An image pickup apparatus according to claim
1, further comprising means for reading an addition
5 signal of all signals in an area of four rows × one
column.

10. An image pickup apparatus according to claim
1, further comprising means for reading an addition
10 signal of all signals in an area of one row × four
columns.

11. An image pickup apparatus comprising:
15 a plurality of pixels;
a color filter array of four colors disposed on
said plurality of pixels and having a periodicity of
two rows × two columns; and
calculating means for calculating two color
difference signals from each color filter of two rows ×
20 two columns in said color filter array having the
periodicity of two rows × two columns.

12. An image pickup apparatus according to claim
11, wherein said calculating means performs an
25 operation of $A + B - C - D$, where A, B, C, and D
represent signals picked up from an area of two rows ×
two columns.

13. An image pickup apparatus according to claim 12, wherein the signals A and B are disposed on a same line or on a same column, and the signals C and D are disposed on a same line or on a same column.

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14. An image signal read method of reading an image signal from the image pickup apparatus recited in claim 1, wherein an image signal is read by performing an operation of $A + B - C - D$, where A, B, C, and D represent signals picked up from an area of two rows \times two columns.

15. An image signal read method according to claim 14, wherein the signals A and B are disposed on a same line or on a same column, and the signals C and D are disposed on a same line or on a same column.

16. An image signal read method according to claim 14, wherein an image signal is read by performing an operation of $A + C - B - D$.

17. An image signal read method according to claim 16, wherein the signals A and B are disposed on a same line or on a same column, and the signals C and D are disposed on a same line or on a same column.

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18. An image signal read method of reading an

image signal from the image pickup apparatus recited in
claim 1, wherein a difference between an addition
signal of a first row, first column signal and a first
row, second column signal and an addition signal of a
5 second row, first column signal and a second row,
second column signal, respectively in an area of two
rows × two columns column, is read as a first color
difference signal, and a difference between an addition
signal of a first row, first column signal and a second
10 row, first column signal and an addition signal of a
first row, second column signal and a second row,
second column signal, respectively in the area of two
rows × two columns column, is read as a second color
difference signal.

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19. An image signal read method according to
claim 15, wherein the areas of two rows × two columns
are disposed without any space therebetween.

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20. An image signal read method of reading an
image signal from the image pickup apparatus recited in
claim 1, wherein an addition signal of all signals in
an area of four rows × two columns is read as a
luminance signal.

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21. An image signal read method of reading an
image signal from the image pickup apparatus recited in

claim 1, wherein an addition signal of all signals in
an area of two rows × four columns is read as a
luminance signal.

- 5 22. An image pickup apparatus comprising:
 a plurality of pixels;
 a color filter array of four colors disposed on
said plurality of pixels;
 first calculating means for calculating a
10 difference between an average signal of a first row,
 first column signal and a first row, second column
 signal in an area of two rows × two columns and an
 average signal of a second row, first column signal and
 a second row, second column signal in the area of two
15 rows × two columns; and
 second calculating means for calculating a
 difference between an average signal of a first row,
 first column signal and a second row, first column
 signal in the area of two rows × two columns and an
 average signal of a first row, second column signal and
 a second row, second column signal in the area of two
20 rows × two columns.
 ~~first calculating means for calculating a
 difference between an average signal of a first row,
 first column signal and a second row, first column
 signal in the area of two rows × two columns and an
 average signal of a first row, second column signal and
 a second row, second column signal in the area of two
 rows × two columns.~~

- 25 23. An image pickup apparatus according to claim
 22, wherein:
 said first calculating means comprises first
 storing means for storing the first row, first column

signal, second storing means for storing the first row, second column signal, third storing means for storing the second row, first column signal, fourth storing means for storing the second row, second column signal,
5 first averaging means for averaging the signals stored in said first and second storage means, second averaging means for averaging the signals stored in said third and fourth storage means, and first difference calculating means for calculating a
10 difference between an averaged signal of the signals stored in said first and second storage means and an averaged signal of the signals stored in said third and fourth storage means; and
15 said second calculating means comprises fifth storing means for storing the first row, first column signal, sixth storing means for storing the second row, first column signal, seventh storing means for storing the first row, second column signal, eighth storing means for storing the second row, second column signal,
20 third averaging means for averaging the signals stored in said third and fourth storage means, fourth averaging means for averaging the signals stored in said fifth and sixth storage means, and second difference calculating means for calculating a
25 difference between an averaged signal of the signals stored in said fifth and sixth storage means and an averaged signal of the signals stored in said seventh

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and eighth storage means.

24. An image signal processing apparatus for the
image pickup apparatus recited in claim 1, comprising
5 means for performing an operation of $A + B - C - D$,
where A, B, C, and D represent signals picked up from
an area of two rows \times two columns.

10 25. An image signal processing apparatus
according to claim 24, wherein the signals A and B are
disposed on a same line or on a same column, and the
signals C and D are disposed on a same line or on a
same column.

15 26. An image signal processing apparatus
according to claim 24, further comprising means for
performing an operation of $A + C - B - D$.

20 27. An image signal processing apparatus
according to claim 26, wherein the signals A and B are
disposed on a same line or on a same column, and the
signals C and D are disposed on a same line or on a
same column.

25 28. An image signal processing method for the
image pickup apparatus recited in claim 1, comprising a
step of performing an operation of $A + B - C - D$, where

A, B, C, and D represent signals picked up from an area of two rows \times two columns.

29. An image signal processing method according
5 to claim 28, wherein the signals A and B are disposed
on a same line or on a same column, and the signals C
and D are disposed on a same line or on a same column.

30. An image signal processing method according
10 to claim 28, comprising a step of performing an
operation of $A + C - B - D$.

31. An image signal processing method according
15 to claim 30, wherein the signals A and B are disposed
on a same line or on a same column, and the signals C
and D are disposed on a same line or on a same column.

32. A computer readable storage medium storing a
program for the image pickup apparatus recited in claim
20 1, wherein the program performs an operation of $A + B -$
 $C - D$, where A, B, C, and D represent signals picked up
from an area of two rows \times two columns.

33. A computer readable storage medium according
25 to claim 32, wherein the signals A and B are disposed
on a same line or on a same column, and the signals C
and D are disposed on a same line or on a same column.

34. A computer readable storage medium according to claim 32, wherein the program further includes a program of performing an operation of $A + C - B - D$.

5 35. A computer readable storage medium according to claim 34, wherein the signals A and B are disposed on a same line or on a same column, and the signals C and D are disposed on a same line or on a same column.

10 36. An image pickup system comprising the image pickup apparatus recited in claim 1 and the image signal processing apparatus recited in claim 24.

15 37. An image pickup system comprising the image pickup apparatus recited in claim 1 and the image signal processing apparatus recited in claim 26.

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